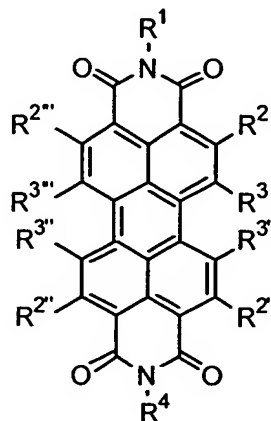


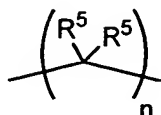
What is claimed is:

1. A method of reducing proliferative capacity of a cell comprising contacting said cell with a compound or a salt thereof or a stereoisomer of compound I  
 5 that has the formula:

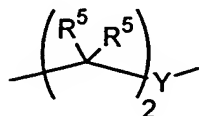


I.

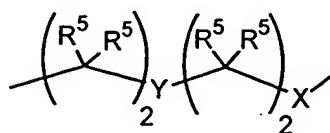
- where R¹ and R⁴ are independently -L-A where L is a linking group having the  
 10 formula:



where n is 1-3; and each R⁵ is independently H, Me, OH, or OMe;

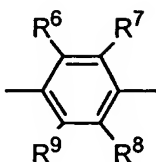


- where R⁵ is as before and Y is O, S, SO, SO₂, NH, NMe, or NCOMe;



where R<sup>5</sup> and Y are as before and X is CH<sub>2</sub>, O, S, SO, SO<sub>2</sub>, NH, NMe, or NCOMe;

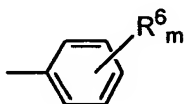
5



where R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are independently H, OMe, OEt, halogen, or Me;

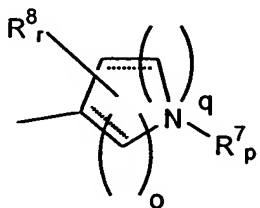
and A is a compound of the formula:

10



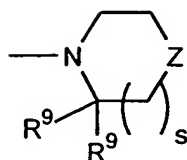
where m is 0-5 and R<sub>6</sub> is halogen, NH<sub>2</sub>, NO<sub>2</sub>, CN, OMe, SO<sub>2</sub>NH<sub>2</sub>, amidino, guanidino, or Me;

15



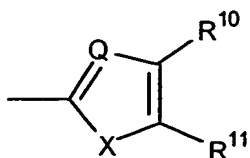
where o is 0-1; p is 0-2; q is 1-2 provided that when o + q is 2, in which case a pyrrolidine or pyrrole ring is indicated, or 3, in which a piperidine or pyridine ring is indicated; r is 0-3; R<sup>7</sup> is H or Me; R<sup>8</sup> is independently Me, NO<sub>2</sub>, OH, CH<sub>2</sub>OH or halogen, and when r is 2-3, two adjacent R<sub>8</sub> substituents are -(CH=CH)<sub>2</sub>- or -(CH<sub>2</sub>)<sub>4</sub>- to form an annulated six-membered ring;

20



where  $R^9$  is independently H, Me, and when R9 is O; s is 0-1; Z is  $CH_2$ , O, NH, NMe, NEt,  $N(Me)_2$ ,  $N(Et)_2$ , or  $NCO_2Et$ ;

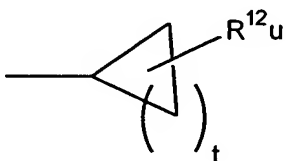
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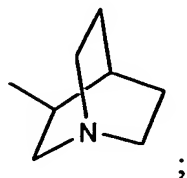
where Q is N, CH, NMe, or NEt; X is O, S, NH, NMe or NEt;  $R^{10}$  and  $R^{11}$  are independently H, Me,  $CH_2CO_2Et$ ,  $R^{10}$  and  $R^{11}$  taken together are  $-(CH=CH)_2-$  or  $-(CH_2)_4-$

10

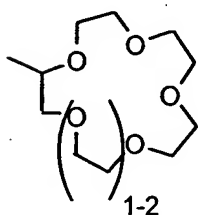
;



where t is 1-4; u is 0-4, and R12 is independently Me, OH,



;



1-2

;

15

$\text{CO}_2\text{R}^{13}$ ,  $\text{CON}(\text{R}^{13})_2$ ,  $\text{SO}_3\text{H}$ ,  $\text{SO}_2\text{N}(\text{R}^{13})_2$ ,  $\text{CN}$ ,  $\text{CH}(\text{CO}_2\text{R}^{13})_2$ ,  $\text{CH}(\text{CON}(\text{R}^{13})_2)_2$ ,  
 $\text{N}(\text{R}^{13})_2$ , or  $\text{N}(\text{R}^{13})_3$  where  $\text{R}^{13}$  is H, Me, Et, or  $\text{CH}_2\text{CH}_2\text{OH}$ ; and  
 $\text{R}^2$ ,  $\text{R}^{2'}$ ,  $\text{R}^{2''}$ ,  $\text{R}^{2'}$ ;  $\text{R}^3$ ,  $\text{R}^{3'}$ ,  $\text{R}^{3''}$ ,  $\text{R}^{3''}$  are each independently H, OMe, halogen, or  
 $\text{NO}_2$ .

- 5                   2.       The method of claim 1, wherein the cell is a mammalian cell.
3.       The method of claim 1, wherein the cell is a human cell.
- 10               4.       The method of claim 1, wherein the cell is a cancer cell.
5.       The method of claim 1, wherein said malignant cell is a breast cancer cell,  
a prostate cancer cell, liver cancer cell, a pancreatic cancer cell, a lung cancer cell, a brain  
cancer cell, an ovarian cancer cell, a uterine cancer cell, a testicular cancer cell, a skin  
15 cancer cell, a leukemia cell, a head and neck cancer cell, an esophageal cancer cell, a  
stomach cancer cell, a colon cancer cell, a retinal cancer cell, a bladder cancer cell, an  
anal cancer cell and a rectal cancer cell.
6.       A method of reducing telomeric extension comprising administering a  
20 compound of claim 1 to a telomerase in the presence of a telomerase substrate.
7.       The method of claim 6, where the telomerase is in a cell.
8.       The method of claim 1, wherein said compound further promotes  
25 apoptosis.
9.       The method of claim 1, wherein said compound further promotes  
apoptosis in a cell.

10. The method of claim 1, wherein the compound is a perylene compound.

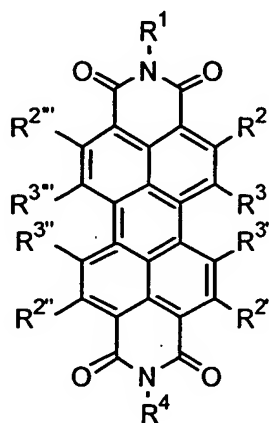
11. The method of claim 1, wherein the compound is N,N'-bis(2-piperdinoethyl)-3,4,9,10-perylenetetracarboxylic acid diimide.

5

12. The method of claim 1, wherein the compound is N,N'-bis(2-dimethylaminoethyl)-3,4,9,10-perylenetetracarboxylic acid diimide.

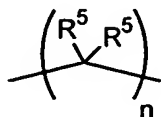
13. A compound of the formula

10



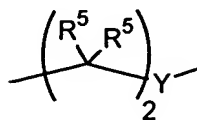
I

where R<sup>1</sup> and R<sup>4</sup> are independently -L-A where L is a linking group having the formula:

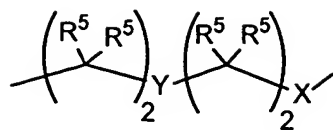


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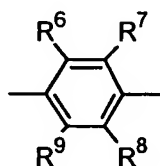
where n is 1-3; and each R<sup>5</sup> is independently H, Me, OH, or OMe;



where R<sup>5</sup> is as before and Y is O, S, SO, SO<sub>2</sub>, NH, NMe, or NCOMe;

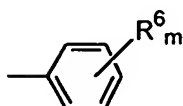


where R<sup>5</sup> and Y are as before and X is CH<sub>2</sub>, O, S, SO, SO<sub>2</sub>, NH, NMe, or  
 5 NCOMe;

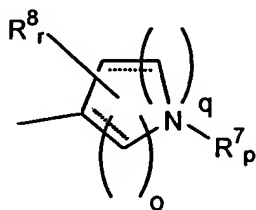


where R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, and R<sup>9</sup> are independently H, OMe, OEt, halogen, or Me;  
 10

and A is a compound of the formula:



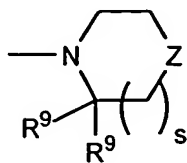
where m is 0-5 and R<sub>6</sub> is halogen, NH<sub>2</sub>, NO<sub>2</sub>, CN, OMe, SO<sub>2</sub>NH<sub>2</sub>, amidino,  
 15 guanidino, or Me;



where o is 0-1; p is 0-2; q is 1-2 provided that when o + q is 2, in which  
 20 case a pyrrolidine or pyrrole ring is indicated, or 3, in which a piperidine or pyridine ring

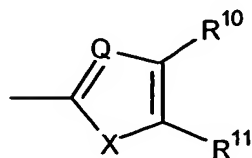
is indicated;  $r$  is 0-3;  $R^7$  is H or Me;  $R^8$  is independently Me,  $\text{NO}_2$ , OH,  $\text{CH}_2\text{OH}$  or halogen, and when  $r$  is 2-3, two adjacent  $R^8$  substituents are  $-(\text{CH}=\text{CH})_2-$  or  $-(\text{CH}_2)_4-$  to form an annulated six-membered ring;

5



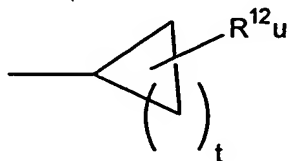
where  $R^9$  is independently H, Me, and when  $R^9$  is O;  $s$  is 0-1;  $Z$  is  $\text{CH}_2$ , O, NH, NMe, NEt,  $\text{N}(\text{Me})_2$ ,  $\text{N}(\text{Et})_2$ , or  $\text{NCO}_2\text{Et}$ ;

10

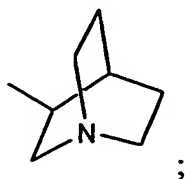


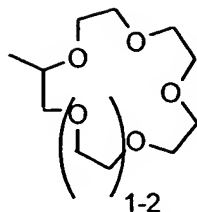
where  $Q$  is N, CH, NMe, or NEt;  $X$  is O, S, NH, NMe or NEt;  $R^{10}$  and  $R^{11}$  are independently H, Me,  $\text{CH}_2\text{CO}_2\text{Et}$ ,  $R^{10}$  and  $R^{11}$  taken together are  $-(\text{CH}=\text{CH})_2-$  or  $-(\text{CH}_2)_4-$ ;

15



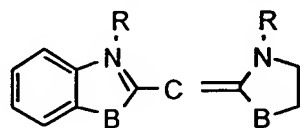
where  $t$  is 1-4;  $u$  is 0-4, and  $R^{12}$  is independently Me, OH,





$\text{CO}_2\text{R}^{13}$ ,  $\text{CON}(\text{R}^{13})_2$ ,  $\text{SO}_3\text{H}$ ,  $\text{SO}_2\text{N}(\text{R}^{13})_2$ ,  $\text{CN}$ ,  $\text{CH}(\text{CO}_2\text{R}^{13})_2$ ,  $\text{CH}(\text{CON}(\text{R}^{13})_2)_2$ ,  
 $\text{N}(\text{R}^{13})_2$ , or  $\text{N}(\text{R}^{13})_3$  where  $\text{R}^{13}$  is H, Me, Et, or  $\text{CH}_2\text{CH}_2\text{OH}$ ; and  
 $\text{R}^2$ ,  $\text{R}^{2'}$ ,  $\text{R}^{2''}$ ,  $\text{R}^{2'}$ ;  $\text{R}^3$ ,  $\text{R}^{3'}$ ,  $\text{R}^{3''}$ ,  $\text{R}^{3'''}$  are each independently H, OMe, halogen, or  
 5  $\text{NO}_2$ .

14. A method of reducing proliferative capacity of a cell comprising contacting said cell with a compound having the formula II or a salt thereof or a stereoisomer of said compound:



II

where C is  $-\text{CH}=\text{CH}-$ ,  $-(\text{CH}=\text{CH})_2-$ ,  $-(\text{CH}=\text{CH})_3-$ , p-phenylene, o-phenylene, p-phenylene- $\text{CH}=\text{CH}-$ , or o-phenylene- $\text{CH}=\text{CH}-$ ; B is O, S, or NR, and R is r Me or Et.

15. The method of claim 14, wherein the cell is a mammalian cell.

16. The method of claim 14, wherein the cell is a human cell.

17. The method of claim 14, wherein the cell is a cancer cell.

18. The method of claim 14, wherein said cancer cell is a breast cancer cell, a prostate cancer cell, liver cancer cell, a pancreatic cancer cell, a lung cancer cell, a brain cancer cell, an ovarian cancer cell, a uterine cancer cell, a testicular cancer cell, a skin cancer cell, a leukemia cell, a head and neck cancer cell, an esophageal cancer cell, a



stomach cancer cell, a colon cancer cell, a retinal cancer cell, a bladder cancer cell, an anal cancer cell and a rectal cancer cell.

19. A method of reducing telomeric extension comprising administering a  
5 compound of claim 14, to a telomerase in the presence of a telomerase substrate.

20. The method of claim 19, where telomerase is in a cell.

21. The method of claim 14, wherein said compound further promotes  
10 apoptosis in a cell.

22. The method of claim 14, wherein the compound is a carbocyanine.

23. The method of claim 22, wherein the carbocyanine is 3,3'-  
15 diethyloxadicarbocyanine (DODC).

24. A method for identifying a candidate compound that inhibits telomerase activity, comprising the steps:

- 20 a) obtaining the three-dimensional structure of a selected compound; and  
b) determining the complementarity of the compound to telomere DNA G-quadruplex

wherein a compound that exhibits at least 75% of the favourable intermolecular interaction energy of the perylene diimide 2-d(TTAGGG)<sub>4</sub> complex structure is indicated to inhibit telomerase activity.

25

25. A method of identifying a telomerase inhibitor comprising:

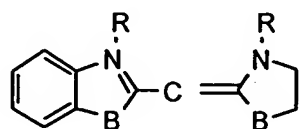
- a) contacting a compound with DNA G-quadruplex; and  
b) determining the melting point of the DNA G-quadruplex

wherein a compound exhibiting an increase in melting point of said quadruplex,  
30 relative to unbound DNA G-quadruplex, is indicated to inhibit telomerase activity.

26. A method of identifying a telomerase inhibitor comprising the steps:  
 a) preparing a DNA G-quadruplex/dye complex wherein the dye is bound with the G-quadruplex;  
 b) contacting said complex with a candidate compound; and  
 c) determining displacement of said dye in the complex by said candidate, wherein displacement of the dye identifies the candidate as a telomerase inhibitor.

27. A method of identifying a telomerase inhibitor comprising:  
 a) contacting a candidate compound to be identified as a telomerase inhibitor with DNA G-quadruplex; and  
 b) determining the fluorescence or UV/VIS spectrum of the compound wherein an increase or decrease of the UV/VIS absorption or fluorescence emission intensity of said compound relative to the UV/VIS absorption or fluorescence emission intensity in the absence of DNA-G-quadruplex indicates telomerase inhibitory activity of the compound.

28. A compound of the formula:



II

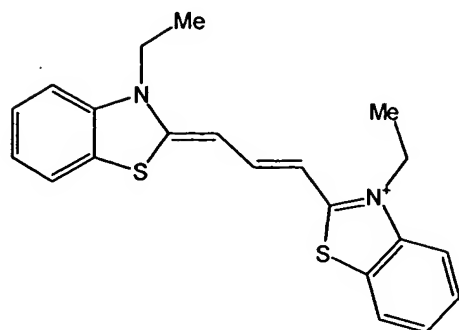
in which C is  $-\text{CH}=\text{CH}-$ ,  $-(\text{CH}=\text{CH})_2-$ ,  $-(\text{CH}=\text{CH})_3-$ , p-phenylene, o-phenylene, p-phenylene- $-\text{CH}=\text{CH}-$ , or o-phenylene- $-\text{CH}=\text{CH}-$ ; B is O, S, or NR, and R is Me or Et.

Additional Claims:

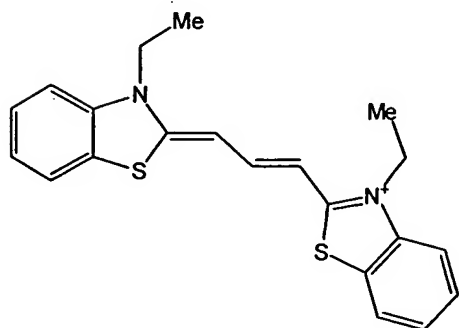
29. The method of claim 1, wherein the mitotic division of a cell is inhibited.

30. The method of claim 14, wherein the mitotic division of a cell is inhibited.

31. A compound of claim 28, having the structure:

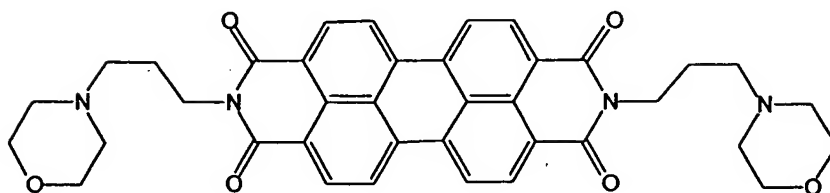


5 32. The method of claim 14, having the structure:



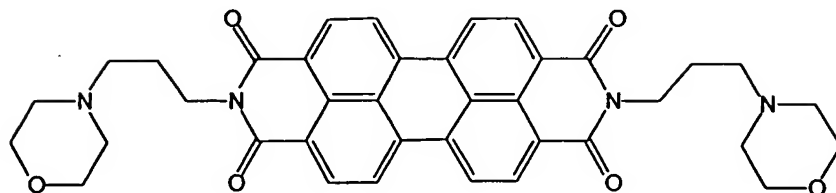
33. A compound of claim 13, having the formula:

10



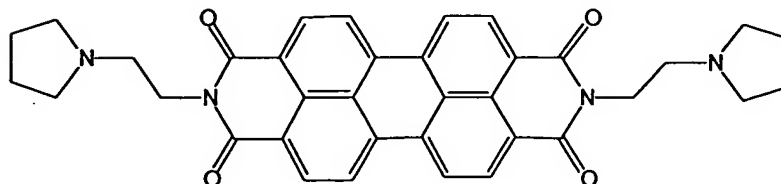
34. The method of claim 1, having the formula:

5



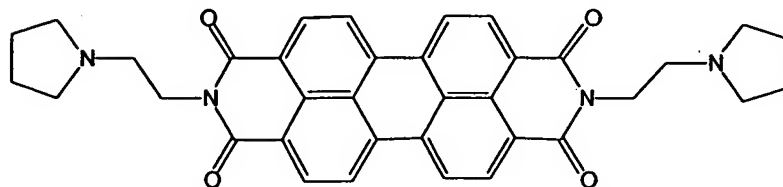
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35. The compound of claim 13, having the formula:



15

36. The method of claim 1, having the structure:



20